

What is claimed is:

1. A code reuse method in a code division multiple access wireless communication system using beamforming by an antenna array, the method comprising:

(a) examining a spatial correlation between a new mobile station requesting communication and each of existing mobile stations using already allocated codes, based on long-term information reflecting spatial characteristics of beams transmitted to the new and existing mobile stations; and

(b) selecting one among the already allocated codes to reuse as a code for the new mobile station depending on the results of the correlation examination.

2. The method as claimed in claim 1, wherein the long-term information includes beam shape and beam size information.

3. The method as claimed in claim 2, wherein the beam shape information includes a departure of angle representing an angle formed between a beam transmitted to a mobile station and a base station, and an angle spread reflecting a thickness of the beam.

4. The method as claimed in claim 1, wherein (a) further comprises:

calculating orthogonal values between the long-term information of the new mobile station and the long-term information of the existing mobile stations using the already allocated codes.

5. The method as claimed in claim 4, wherein (a) further comprises:

selecting a minimum orthogonal value from the calculated orthogonal values; and

comparing the selected minimum orthogonal value with a predetermined critical value.

6. The method as claimed in claim 5, wherein (b) further comprises selecting an already allocated code of an existing mobile station having the minimum orthogonal value as the code for the new mobile station when the selected minimum orthogonal value is less than the predetermined critical value.

7. A code reuse apparatus in a code division multiple access wireless communication system using beamforming by an antenna array, the apparatus comprising:

a correlation examination unit for examining a spatial correlation between a new mobile station requesting communication and each of existing mobile stations using already allocated codes, based on long-term information reflecting spatial characteristics of beams transmitted to the new and existing mobile stations; and

a reuse code selection unit for selecting one among the already allocated codes to reuse as a code for the new mobile station depending on the results of the correlation examination.

8. The apparatus as claimed in claim 7, wherein the long-term information includes beam shape and beam size information.

9. The apparatus as claimed in claim 8, wherein the beam shape information includes a departure of angle representing an angle formed between a beam transmitted to a mobile station and a base station, as well as an angle spread reflecting a thickness of the beam.

10. The apparatus as claimed in claim 7, wherein the correlation examination unit calculates orthogonal values between the long-term information of the new mobile station and the long-term information of the existing mobile stations using the already allocated codes.

11. The apparatus as claimed in claim 10, wherein the correlation examination unit selects a minimum orthogonal value from the calculated orthogonal values and compares the selected minimum orthogonal value with a predetermined critical value.

12. The apparatus as claimed in claim 11, wherein the reuse code selection unit selects an already allocated code of an existing mobile station having the minimum orthogonal value as the code for the new mobile station when the selected minimum orthogonal value is less than the predetermined critical value.

13. A code reuse apparatus in a code division multiple access wireless communication system using beamforming by an antenna array, the apparatus comprising:

an orthogonal code generation unit for determining whether a code will be reused or not and generating orthogonal code information according to the determination results;

a long-term information and code information storage unit for storing long-term information reflecting spatial characteristics of beams transmitted to existing mobile stations and code information allocated to the existing mobile stations; and

a code reuse unit for examining a spatial correlation between a new mobile station requesting communication and each of existing mobile stations using already allocated codes, based on the long-term information and selecting one among the already allocated codes to reuse as a code for the new mobile station depending on the results of the correlation examination.

14. The apparatus as claimed in claim 13, wherein the orthogonal code generation unit includes:

a code reuse determination unit for determining whether an unused code remains to be allocated to the new mobile station, outputting a code reuse OFF signal to the code reuse unit when an unused code remains, and outputting a code reuse ON signal to the code reuse unit when no unused code remains; and

a code allocation unit for allocating a remaining unused code to the new mobile station when the code reuse OFF signal is output, and outputting the code information allocated to the existing mobile stations to the long-term information and code information storage unit when the code reuse ON signal is output.

15. The apparatus as claimed in claim 14, wherein the long-term information and code information storage unit further stores a mobile station

index corresponding to the stored long-term information and code information.

16. The apparatus as claimed in claim 15, wherein the code reuse unit comprises:

an orthogonality comparison unit for comparing the long-term information of the existing mobile stations having the already allocated codes, which is received in the long-term information and code information storage unit, with long-term information of the new mobile station, when the code reuse ON signal is received from the orthogonal code generation unit; and

a reuse code selection unit for selecting an already allocated code as a code for the new mobile station depending on the results of the orthogonality comparison.

17. The apparatus as claimed in claim 16, wherein the orthogonality comparison unit comprises:

a minimum orthogonal value selection unit for selecting a minimum orthogonal value among orthogonal values between the long-term information of the existing mobile stations using the already allocated codes and the long-term information of the new mobile station requesting communication; and

a reuse possibility determination unit for outputting an index having the minimum orthogonal value to the reuse code selection unit when the selected minimum orthogonal value is less than a predetermined critical value.

18. The apparatus as claimed in claim 17, wherein the reuse code selection unit receives the index from the reuse possibility determination unit and selects a code corresponding to the index as the code for the new mobile station.

19. The apparatus as claimed in claim 13, wherein the long-term information includes beam shape and beam size information.

20. The apparatus as claimed in claim 19, wherein the beam shape information includes a departure of angle representing an angle formed between a beam transmitted to a mobile station and a base station, as well as an angle spread reflecting a thickness of the beam.